Name:

at1119paper: Complete the Square, $b =$ odd (v501)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 59x = -598$$

Add $\left(\frac{-59}{2}\right)^2$, which equals $\frac{3481}{4}$, to both sides of the equation.

$$x^2 - 59x + \frac{3481}{4} = \frac{1089}{4}$$

Factor the left side.

$$\left(x + \frac{-59}{2}\right)^2 = \frac{1089}{4}$$

Undo the squaring.

$$x + \frac{-59}{2} = \frac{-33}{2} \quad \text{or} \quad x + \frac{-59}{2} = \frac{33}{2}$$
$$x = \frac{59 - 33}{2} \quad \text{or} \quad x = \frac{59 + 33}{2}$$
$$x = 13 \quad \text{or} \quad x = 46$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 55x = -294$$

$$x^2 + 55x + \frac{3025}{4} = \frac{1849}{4}$$
$$\left(x + \frac{55}{2}\right)^2 = \frac{1849}{4}$$

$$x + \frac{55}{2} = \frac{-43}{2} \quad \text{or} \quad x + \frac{55}{2} = \frac{43}{2}$$
$$x = \frac{-55 - 43}{2} \quad \text{or} \quad x = \frac{-55 + 43}{2}$$
$$x = -49 \quad \text{or} \quad x = -6$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 51x = 1800$$

$$x^2 + 51x + \frac{2601}{4} = \frac{9801}{4}$$

$$\left(x + \frac{51}{2}\right)^2 = \frac{9801}{4}$$

$$x + \frac{51}{2} = \frac{-99}{2} \quad \text{or} \quad x + \frac{51}{2} = \frac{99}{2}$$

$$x = \frac{-51 - 99}{2} \quad \text{or} \quad x = \frac{-51 + 99}{2}$$

$$x = -75 \quad \text{or} \quad x = 24$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 17x = 38$$

$$x^2 + 17x + \frac{289}{4} = \frac{441}{4}$$

$$\left(x + \frac{17}{2}\right)^2 = \frac{441}{4}$$

$$x + \frac{17}{2} = \frac{-21}{2} \quad \text{or} \quad x + \frac{17}{2} = \frac{21}{2}$$

$$x = \frac{-17 - 21}{2} \quad \text{or} \quad x = \frac{-17 + 21}{2}$$

$$x = -19 \quad \text{or} \quad x = 2$$